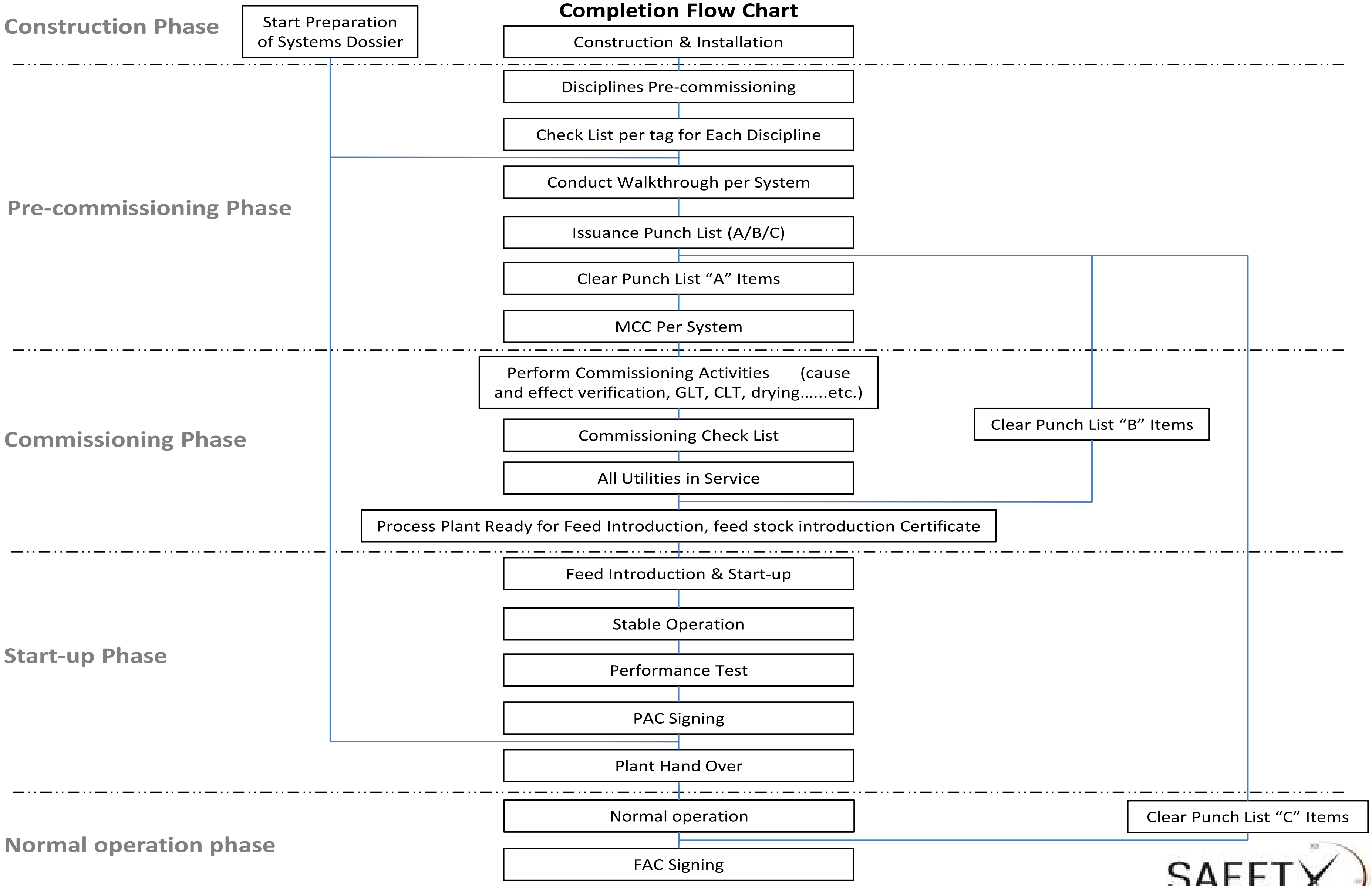
Completion Flow Chart



Construction Phase

Start Preparation of Systems Dossier

Construction & Installation

Pre-commissioning Phase

Disciplines Pre-commissioning

Check List per tag for Each Discipline

Conduct Walkthrough per System

Issuance Punch List (A/B/C)

Clear Punch List “A” Items

MCC Per System

Commissioning Phase

Perform Commissioning Activities (cause and effect verification, GLT, CLT, drying......etc.)

Commissioning Check List

All Utilities in Service

Clear Punch List “B” Items

Process Plant Ready for Feed Introduction, feed stock introduction Certificate

Start-up Phase

Feed Introduction & Start-up

Stable Operation

Performance Test

PAC Signing

Plant Hand Over

Normal operation phase

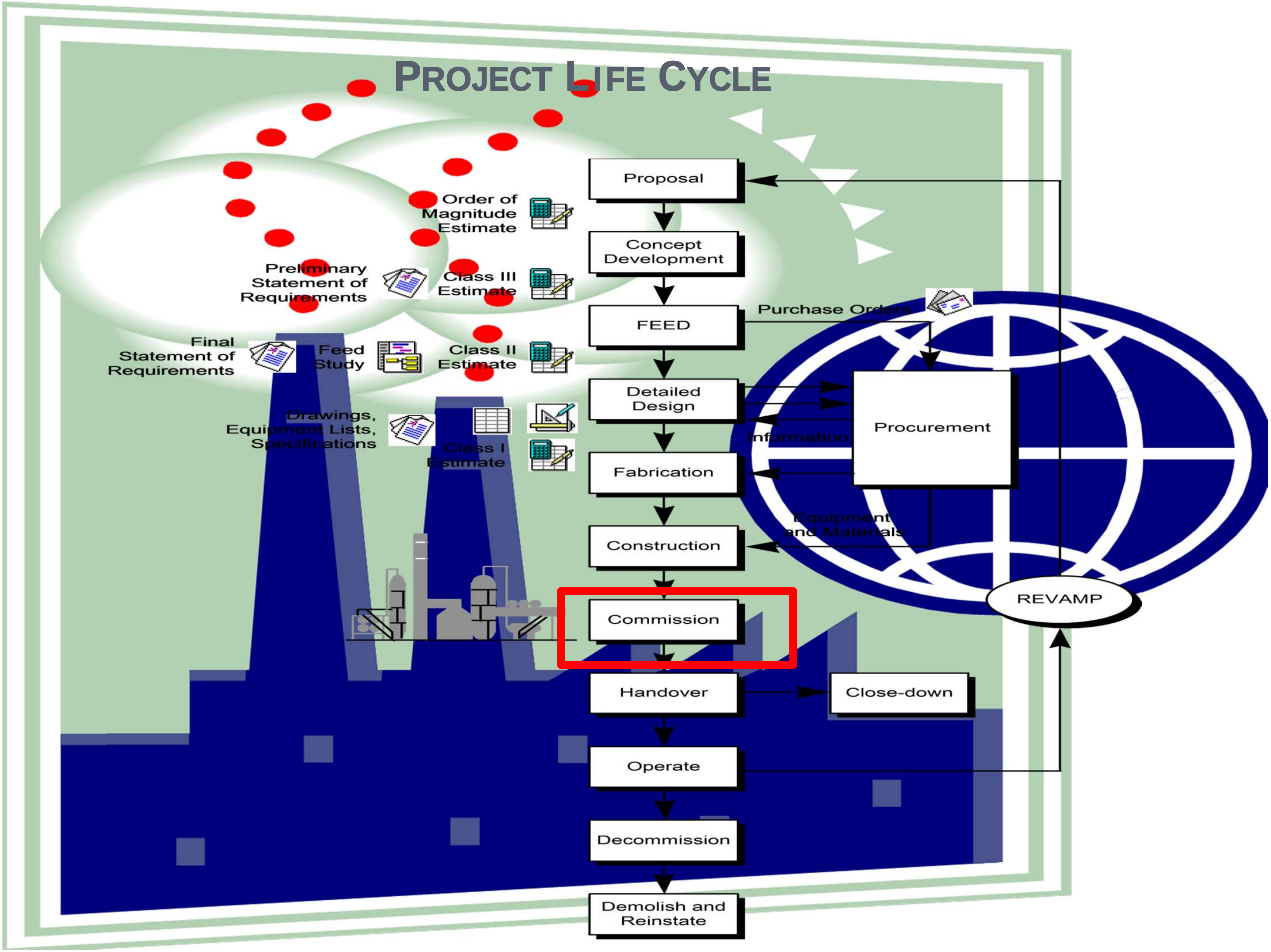
Normal operation

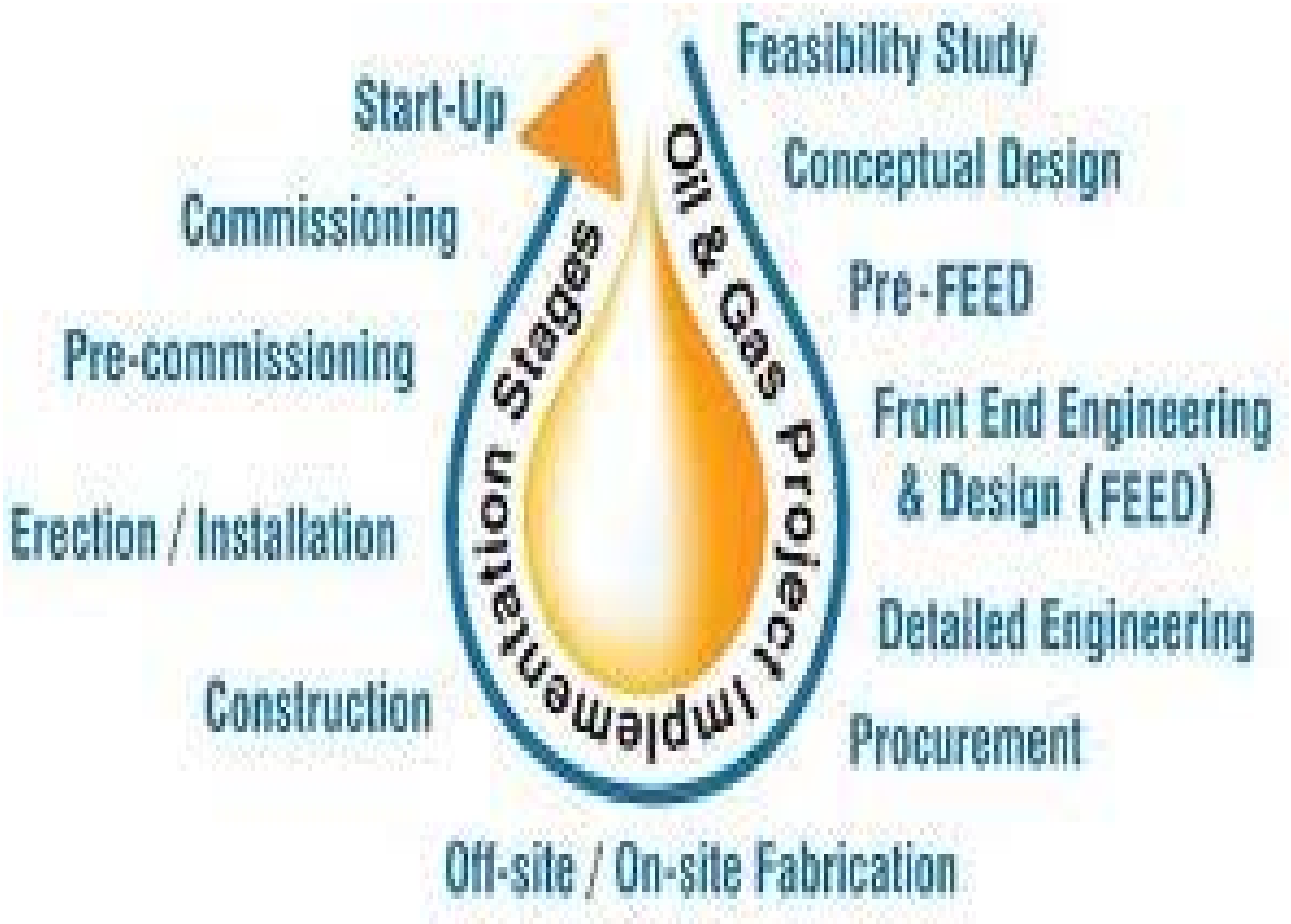
Clear Punch List “C” Items

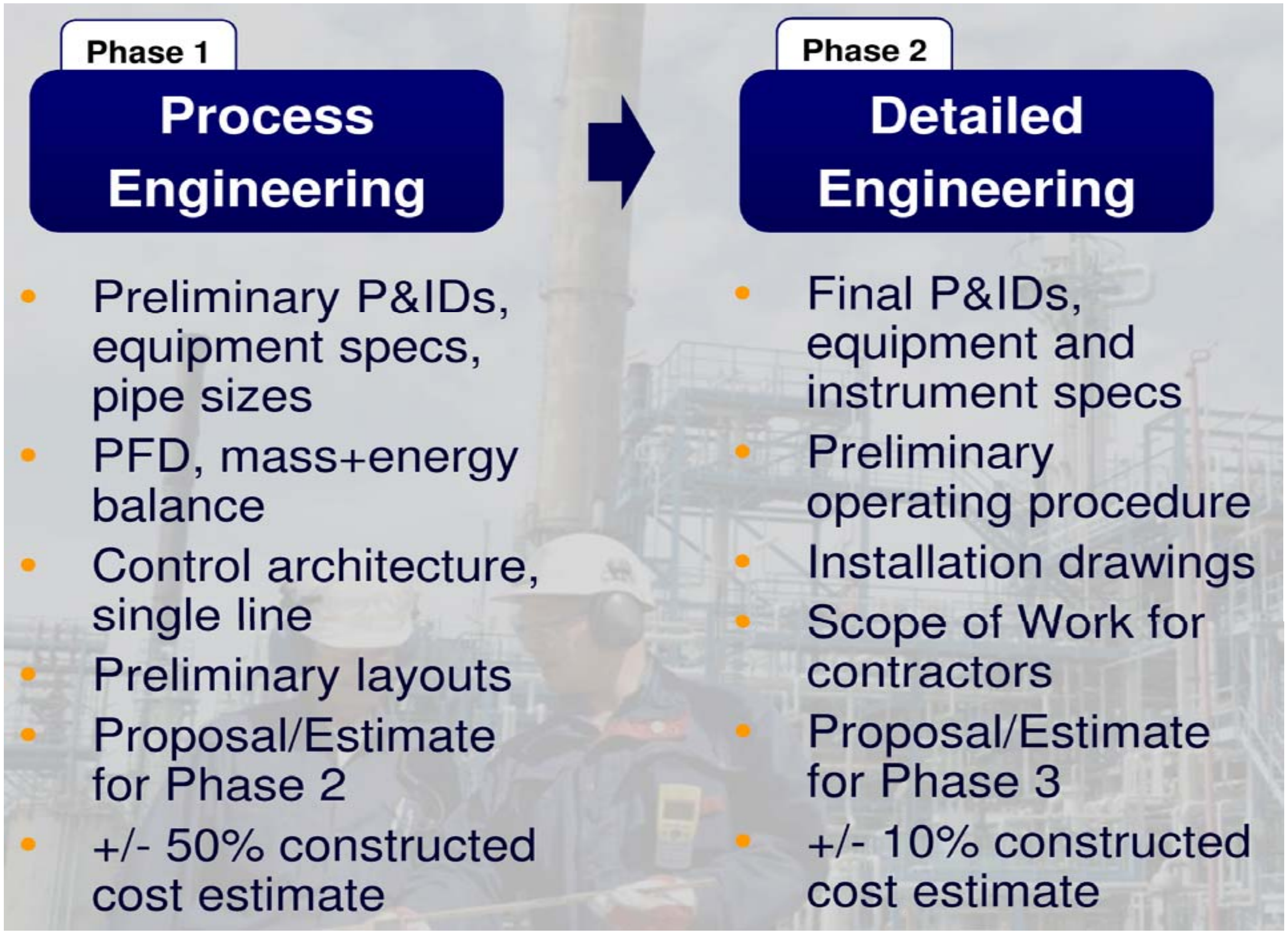
FAC Signing

SAFETY 24/7

PROJECT LIFE CYCLE




Oil & Gas Project Implementation Stages
Feasibility Study
Conceptual Design
Pre-FEED
Front End Engineering & Design (FEED)
Detailed Engineering
Procurement
Off-site / On-site Fabrication
Construction
Erection / Installation
Pre-commissioning
Commissioning
Start-Up



Phase 1

Process Engineering

- Preliminary P&IDs, equipment specs, pipe sizes
- PFD, mass+energy balance
- Control architecture, single line
- Preliminary layouts
- Proposal/Estimate for Phase 2
- +/- 50% constructed cost estimate

Phase 2

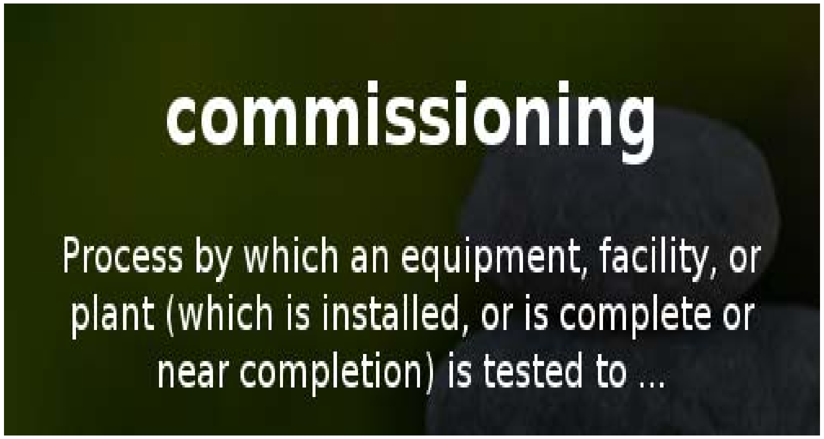
Detailed Engineering

- Final P&IDs, equipment and instrument specs
- Preliminary operating procedure
- Installation drawings
- Scope of Work for contractors
- Proposal/Estimate for Phase 3
- +/- 10% constructed cost estimate

7. Commissioning

- Once the construction is complete, a period of testing and commissioning will begin. Pre-commissioning tests will be carried out to check for (mechanical) system integrity and that equipment such as pumps and valves operate correctly.

- Checks will also be made of the electrical and instrumentation installations. Other activities during pre-commissioning will be carried out to prepare for operation and include performance checks (such as setting of motor solo run and loading of catalyst.

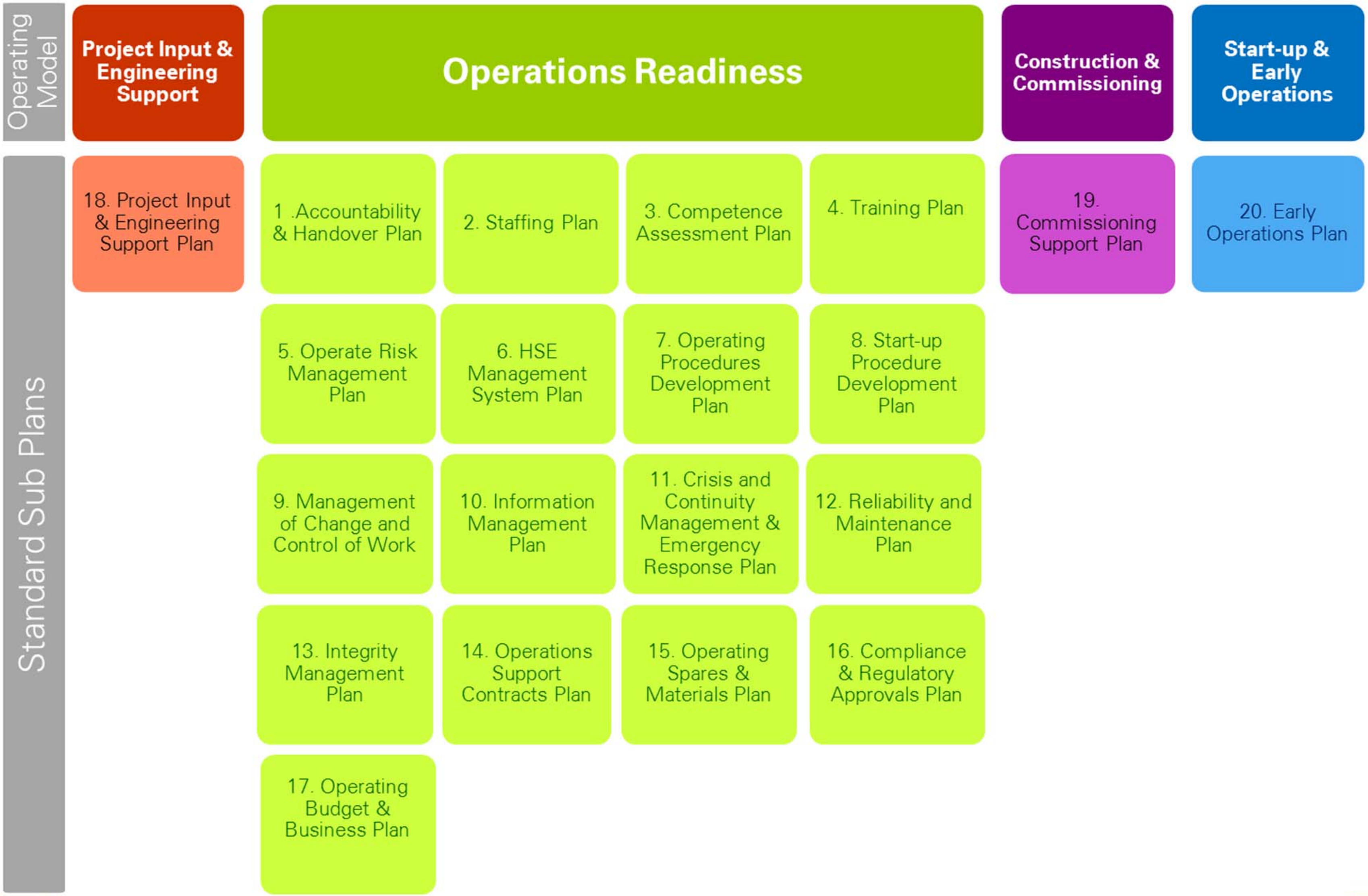


commissioning

Process by which an equipment, facility, or plant (which is installed, or is complete or near completion) is tested to ...

- Once pre-commissioning tests complete, commissioning can start. This normally carried out by a special team CIT
- Because of hazards associated with starting up a plant, this work will have been carefully specified and carried out to a commissioning plan

Plans Overview



Operating Model

Project Input & Engineering Support

Operations Readiness

Construction & Commissioning

Start-up & Early Operations

Standard Sub Plans

18. Project Input & Engineering Support Plan

1 .Accountability & Handover Plan

2. Staffing Plan

3. Competence Assessment Plan

4. Training Plan

19. Commissioning Support Plan

20. Early Operations Plan

5. Operate Risk Management Plan

6. HSE Management System Plan

7. Operating Procedures Development Plan

8. Start-up Procedure Development Plan

9. Management of Change and Control of Work

10. Information Management Plan

11. Crisis and Continuity Management & Emergency Response Plan

12. Reliability and Maintenance Plan

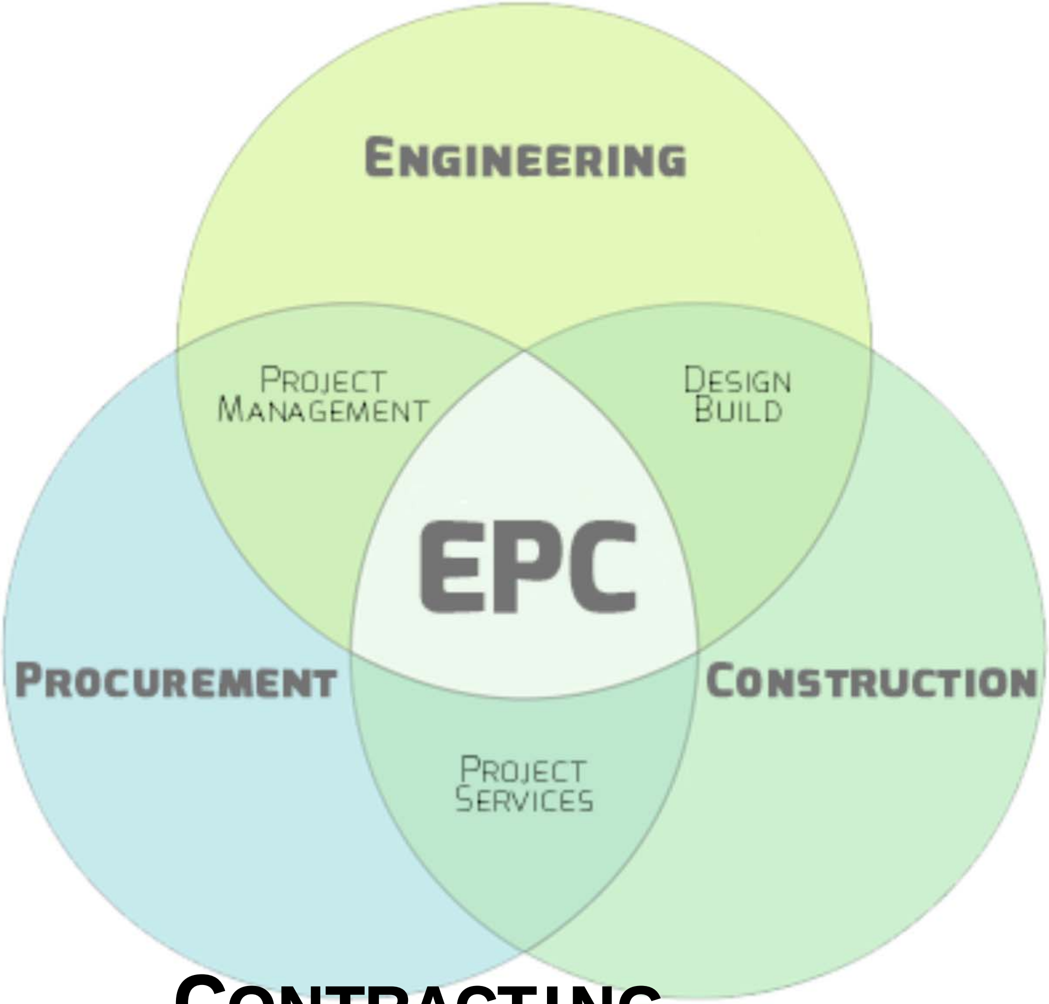
13. Integrity Management Plan

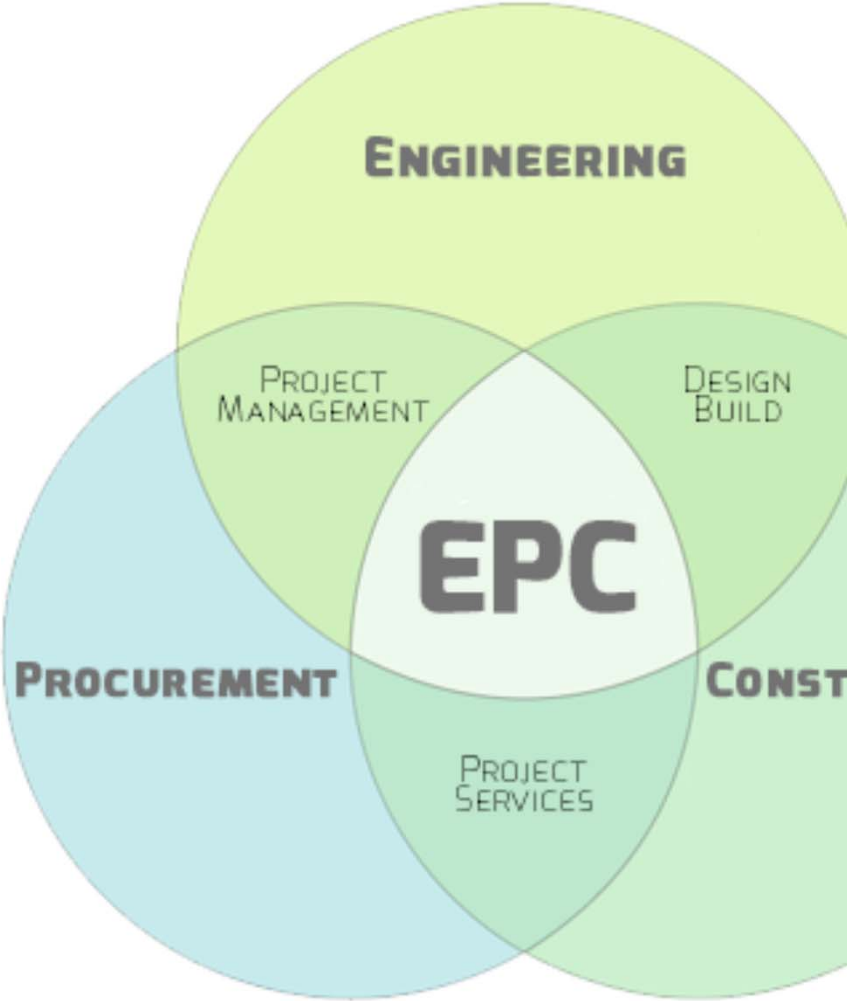
14. Operations Support Contracts Plan

15. Operating Spares & Materials Plan

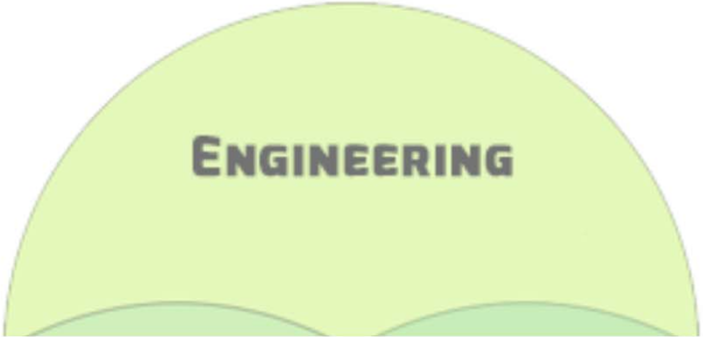
16. Compliance & Regulatory Approvals Plan

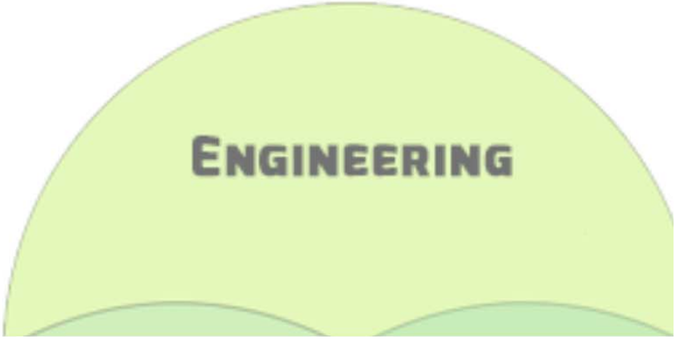
17. Operating Budget & Business Plan



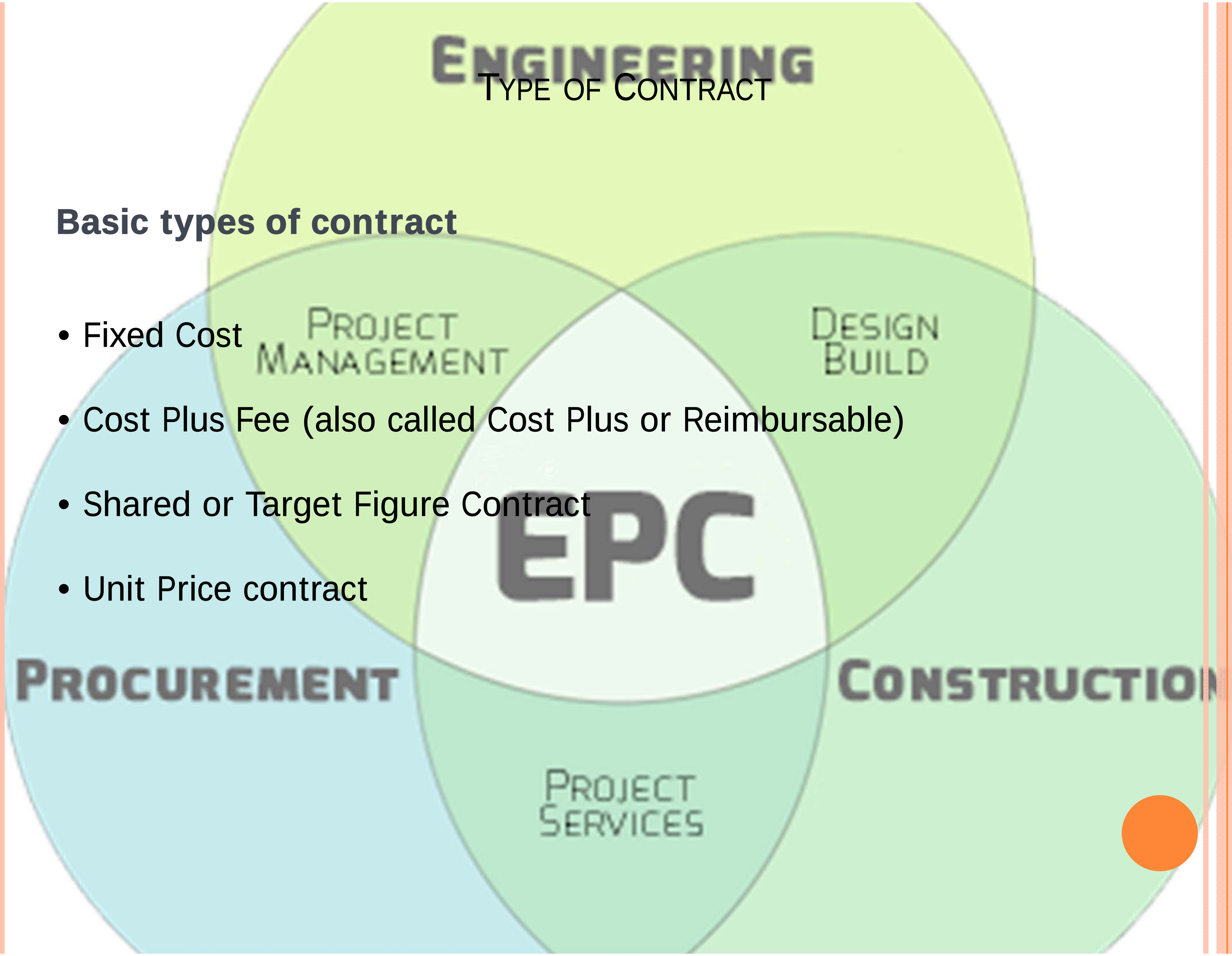


CONTRACTING





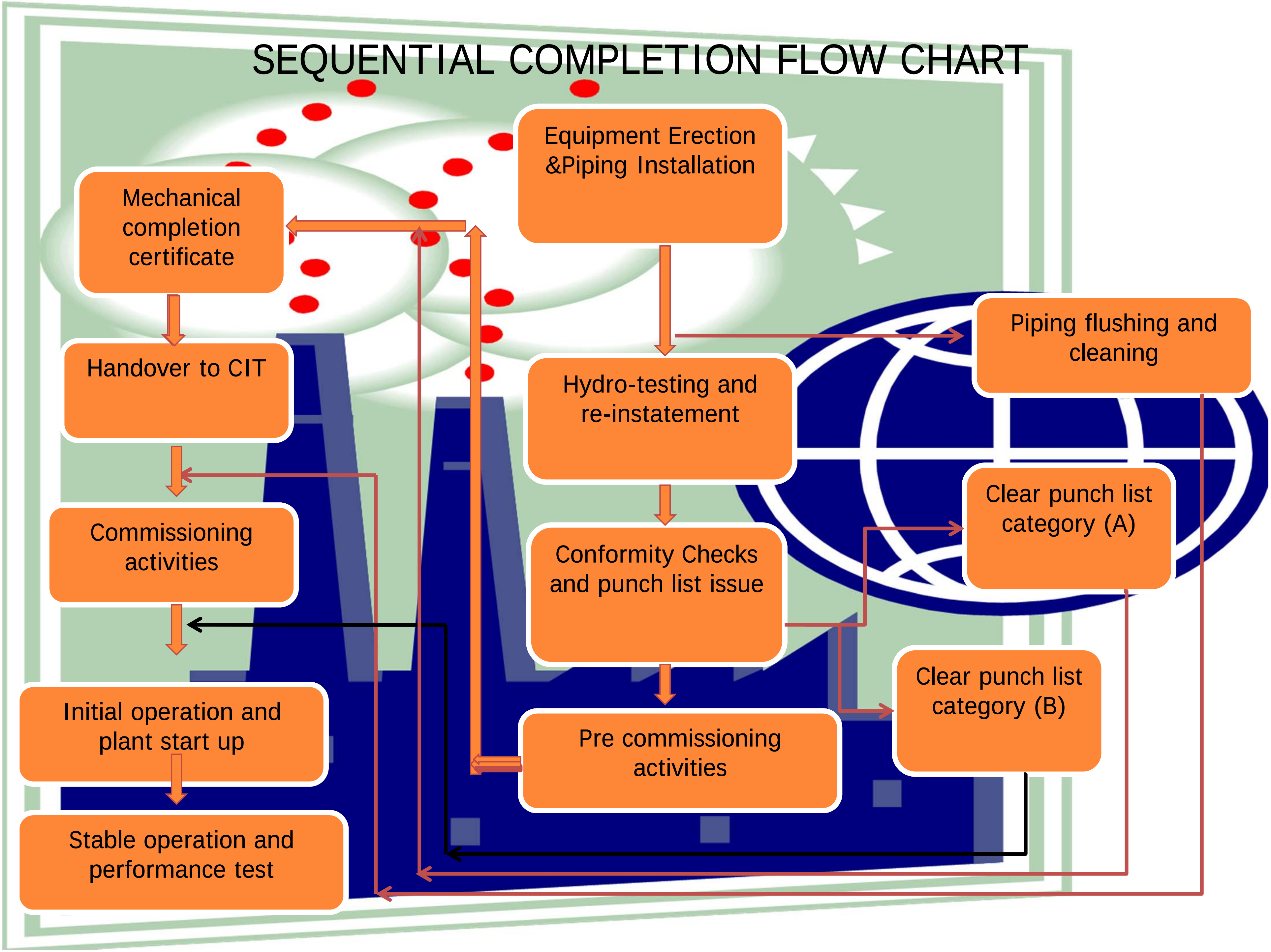
TYPE OF CONTRACT



Basic types of contract

- Fixed Cost
- Cost Plus Fee (also called Cost Plus or Reimbursable)
- Shared or Target Figure Contract
- Unit Price contract

SEQUENTIAL COMPLETION FLOW CHART



Equipment Erection &Piping Installation

Hydro-testing and re-instatement

Piping flushing and cleaning

Conformity Checks and punch list issue

Clear punch list category (A)

Clear punch list category (B)

Pre commissioning activities

Mechanical completion certificate

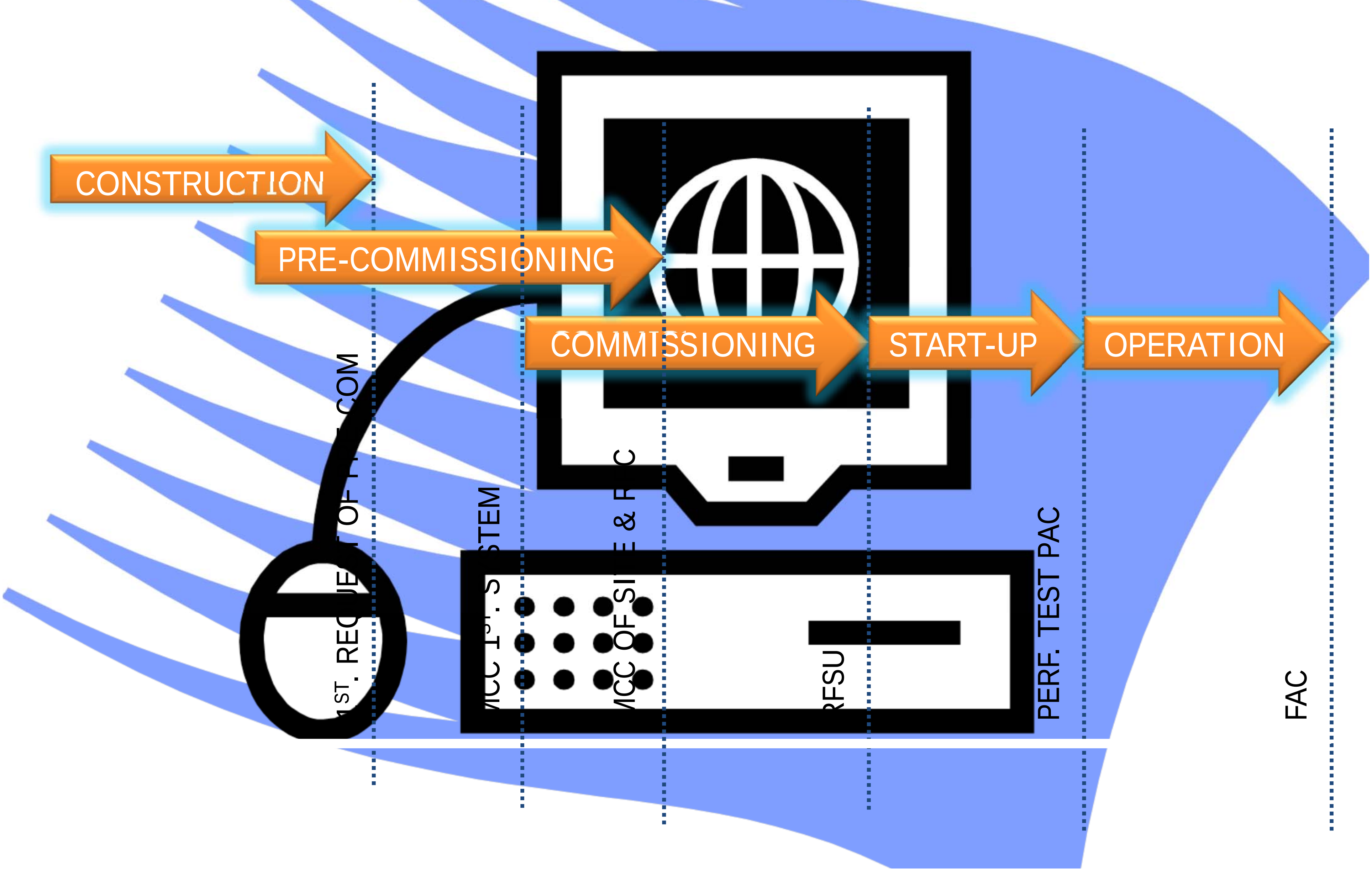
Handover to CIT

Commissioning activities

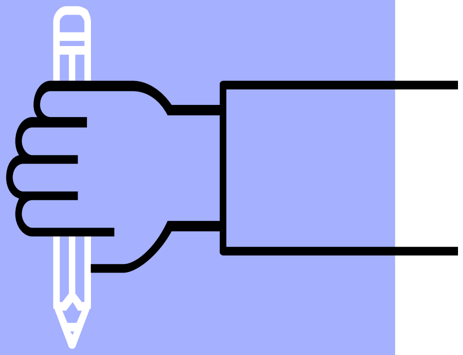
Initial operation and plant start up

Stable operation and performance test

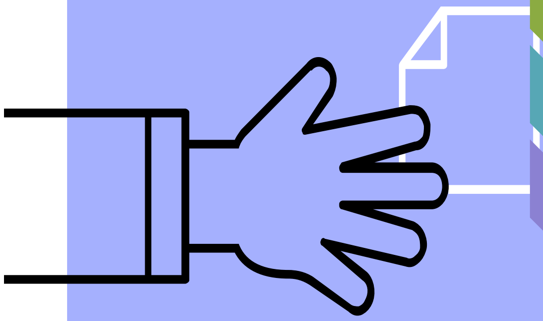
Methodology – Phasing of Activities



9 KEYS



1. Planning
2. Mechanical completion
3. P & ID Conformity Check
4. Pre-commissioning
5. Commissioning
6. Start Up
7. Initial Operation
8. Performance Test
9. Post Commissioning

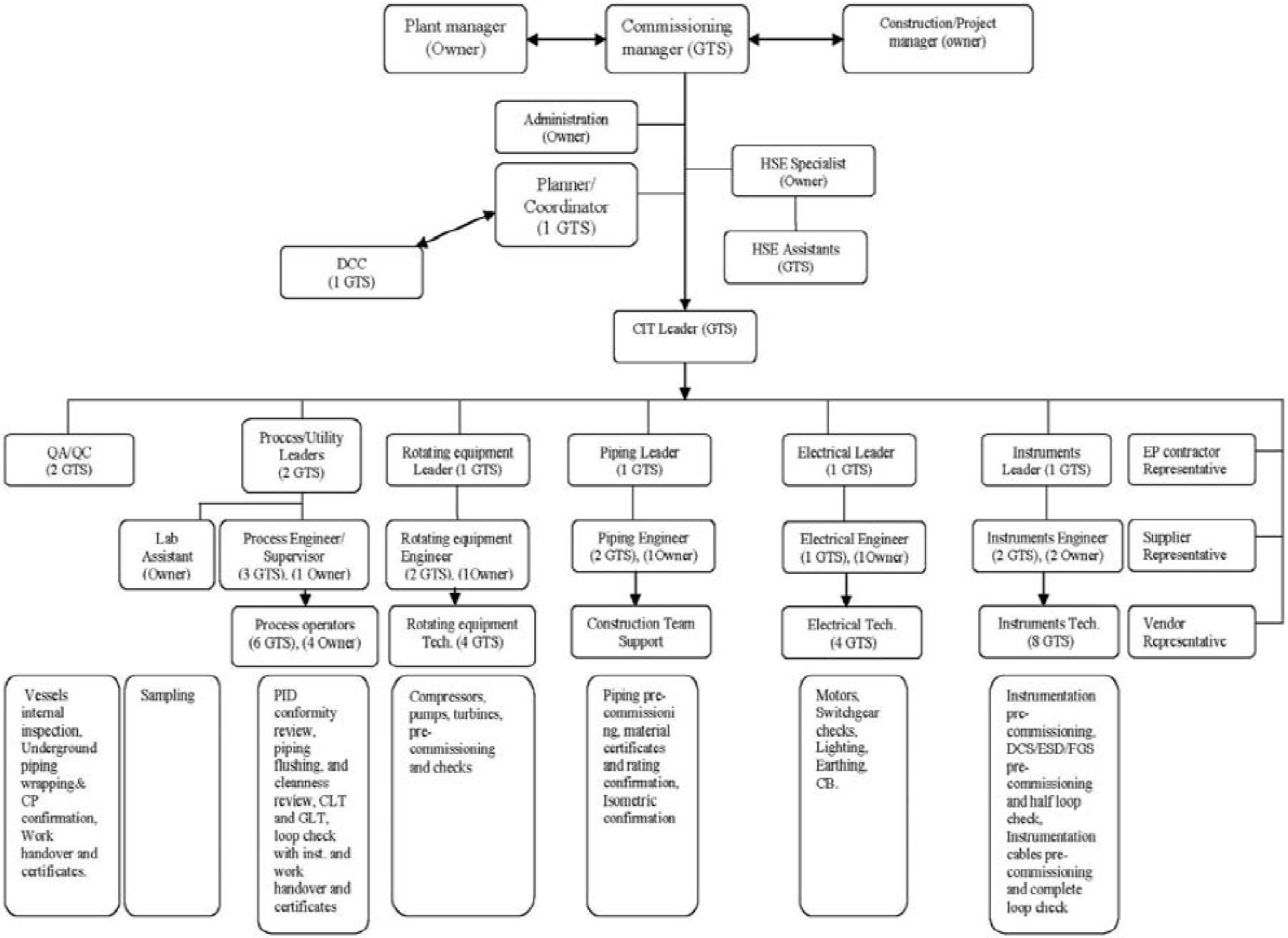


Management Functions

- Organization and roles
- Information Management
- Procedure development
- Safety and risk management
- Permit systems
- Job safety analysis
- Planning and control
- Budgeting and cost control
- Commissioning strategy.

Technical Functions

- Plant preparation and isolation
- Utilities and Electrical System commissioning
- Equipment specific commissioning Issues
- Machinery/Rotating Equipment
- Vessels, Towers and pipe work etc.
- Removal of hazardous substances and purging
- Instrumentation commissioning



Plant manager (Owner)

Commissioning manager (GTS)

Construction/Project manager (owner)

Administration (Owner)

Planner/ Coordinator (1 GTS)

DCC (1 GTS)

HSE Specialist (Owner)

HSE Assistants (GTS)

CIT Leader (GTS)

QA/QC (2 GTS)

Process/Utility Leaders (2 GTS)

Rotating equipment Leader (1 GTS)

Piping Leader (1 GTS)

Electrical Leader (1 GTS)

Instruments Leader (1 GTS)

EP contractor Representative

Lab Assistant (Owner)

Process Engineer/ Supervisor (3 GTS), (1 Owner)

Rotating equipment Engineer (2 GTS), (1Owner)

Piping Engineer (2 GTS), (1Owner)

Electrical Engineer (1 GTS), (1Owner)

Instruments Engineer (2 GTS), (2 Owner)

Supplier Representative

Process operators (6 GTS), (4 Owner)

Rotating equipment Tech. (4 GTS)

Construction Team Support

Electrical Tech. (4 GTS)

Instruments Tech. (8 GTS)

Vendor Representative

Vessels internal inspection, Underground piping wrapping& CP confirmation, Work handover and certificates.

Sampling

PID conformity review, piping flushing, and cleanness review, CLT and GLT, loop check with inst. and work handover and certificates

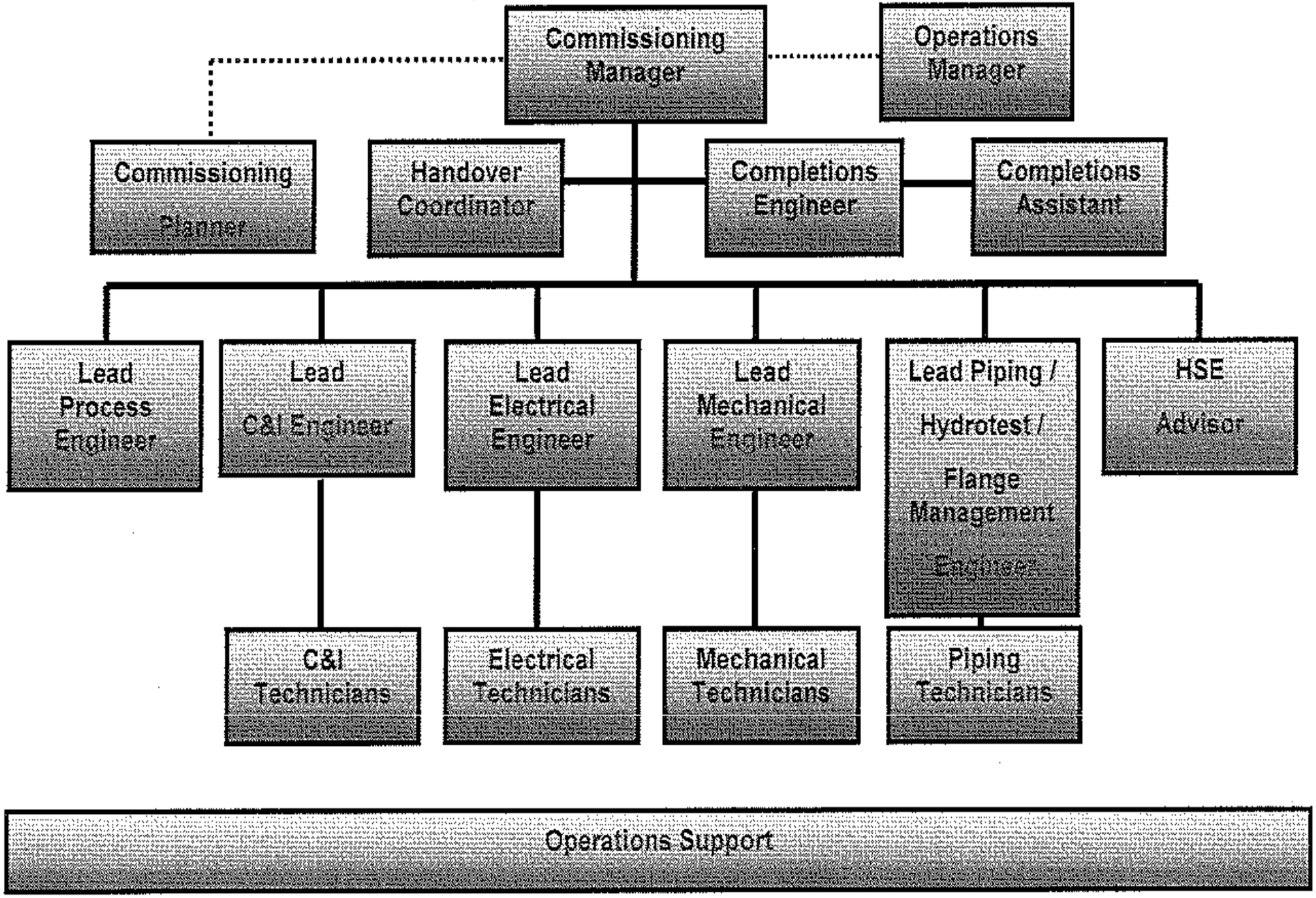
Compressors, pumps, turbines, pre-commissioning and checks

Piping pre-commissioning, material certificates and rating confirmation, Isometric confirmation

Motors, Switchgear checks, Lighting, Earthing, CB.

Instrumentation pre-commissioning, DCS/ESD/FGS pre-commissioning and half loop check, Instrumentation cables pre-commissioning and complete loop check

Classic Commissioning Team



Commissioning Manager

Operations Manager

Commissioning Planner

Handover Coordinator

Completions Engineer

Completions Assistant

Lead Process Engineer

Lead C&I Engineer

Lead Electrical Engineer

Lead Mechanical Engineer

Lead Piping / Hydrotest / Flange Management Engineer

HSE Advisor

C&I Technicians

Electrical Technicians

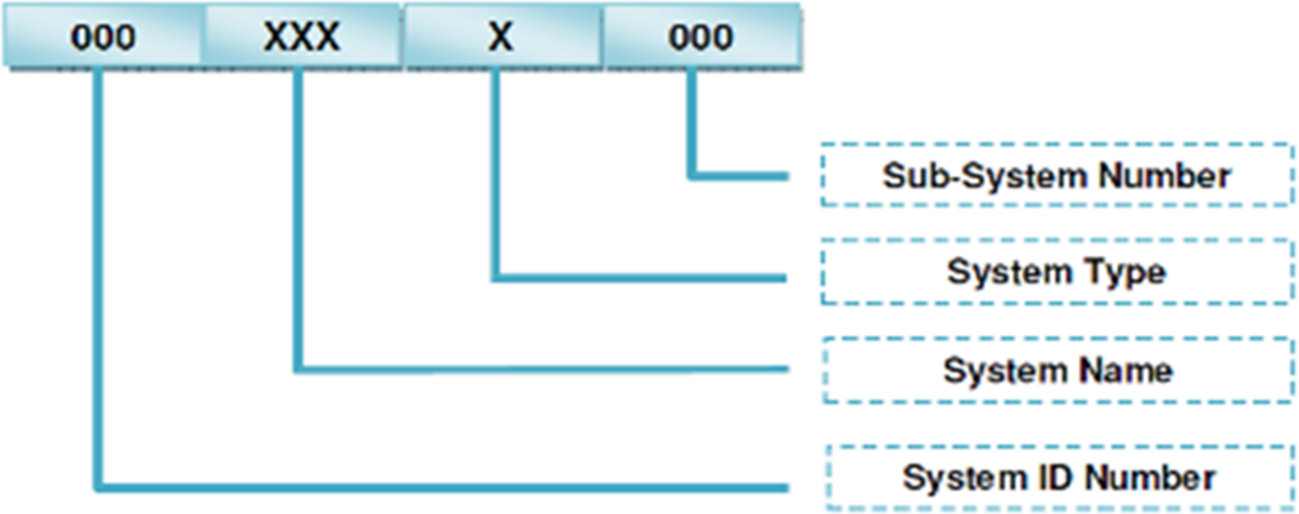
Mechanical Technicians

Piping Technicians

Operations Support

Commissioning Documents

- Discipline Ready for Pre-commissioning Notice. (DRPN)
- Discipline Mechanical Completion Notice.
- System Mechanical Completion Notice.
- Mechanical Completion Certificate.
- Punch list sheets.
- Discipline Ready for Commissioning Notice (DRCN)
- Inspection and Test Report. (ITR)



000 XXX X 000

Sub-System Number

System Type

System Name

System ID Number

System ID Number: Process Unit (100)
Utilities (400)
Storage & Pumping (500)

System Name: Contain 3 Letters (FIM, HPS, INH .... etc)

System Type:
Process: P
Utilities: U
Storage & Pumping: S

Sub-System Number: Contain 3 Digits (000)

For Example: Flare System: 400 FLH U 000
(400-FLH-U-000)

Pre-commissioning Dossier

Pre-commissioning Dossier shall include as a minimum (for each Discipline):

- Marked up P&ID, SLD and wiring diagrams – indicating system boundary (updated marked up P&ID's will be issued as required)
- List of all component in the system such as instruments, equipment, etc.
- Related hydrotest loops included in the system.
- Hydrotest completion certificates.
- All pre-commissioning check Lists related to the system.
- Technical Query.
- Preservation / Maintenance Records.
- System Punch list.
- System Mechanical completion certificate.

PRE-COMMISSIONING ACTIVITIES

Main pre-commissioning activities are :

- Water Flushing.
- Dewatering and Air Blowing.
- Piping final reinstatement.
- P&ID's conformity checks.
- Punch listing (issuing and clearing).
- Instrument cables meggering and continuity checks.
- Instruments Bench Calibration.
- Safety valves Bench Calibration.
- Electrical cables meggering and continuity checks.
- Instrument control loops checking.
- Final visual checking and boxing up all static equipment.
- Lube oil flushing.

PRE-COMMISSIONING ACTIVITIES

P&ID's conformity checks

Dewatering and Air Blowing

Water Flushing

Piping final reinstatement

Punch listing (issuing and clearing)

Cables meggering and continuity checks

Bench Calibration

Safety valves Bench Calibration

Electrical cables meggering and continuity checks

Control loops checking

Final visual checking and boxing up all static equipment.

SYSTEM MECHANICAL COMPLETION CERTIFICATE (MCC)

PROJECT TITLE :

PROJECT No :

SYSTEM NAME :

SYSTEM ID :

THIS IS TO CERTIFY THAT:

- THE ABOVE SYSTEM HAS BEEN FABRICATED, ERECTED, INSTALLED AND TESTED TO THE REQUIREMENTS OF THE CONTRACT DRAWINGS, SPECIFICATIONS, THE APPLICABLE CODES AND STANDARDS.
- ALL PRE-COMMISSIONING RELEVANT ACTIVITIES, TESTS, INSPECTIONS AND CHECKS HAVE BEEN CARRIED OUT FOR THIS SYSTEM AND FOUND ACCEPTABLE.
- Q/C DOCUMENTATION OF THE ABOVE SYSTEM HAS BEEN AUDITED BY THE CUSTOMER SITE QUALITY CONTROL AND FOUND COMPLETED.
- ALL PUNCH LIST ITEMS CATEGORY (A) IN THIS SUBSYSTEM WERE CLEARED.
- THIS SYTEM IS MECHANICALLY COMPLETED ON THE DATE MONTH, DAY, YEAR AND READY FOR COMMISSIONING (RFC) WITH THE FOLLOWING EXCEPTIONS.

EXCEPTIONS :

NOTE: ACCEPTANCE OF THE ABOVE SYSTEM DOES NOT RELIEVE ENPPI/CONSTRUCTION CONTRACTOR FROM THEIR CONTRACTUAL OBLIGATIONS AND RESPONSIBILITIES.

COMPANY	CONST. CONTRACTOR	ENPPI	CUSTOMER
NAME			
TITLE			
SIGNATURE			
DATE			

PROJECT MECHANICAL COMPLETION CERTIFICATE
(PROJECT MCC)

PROJECT TITLE :

PROJECT No :

THIS IS TO CERTIFY THAT:

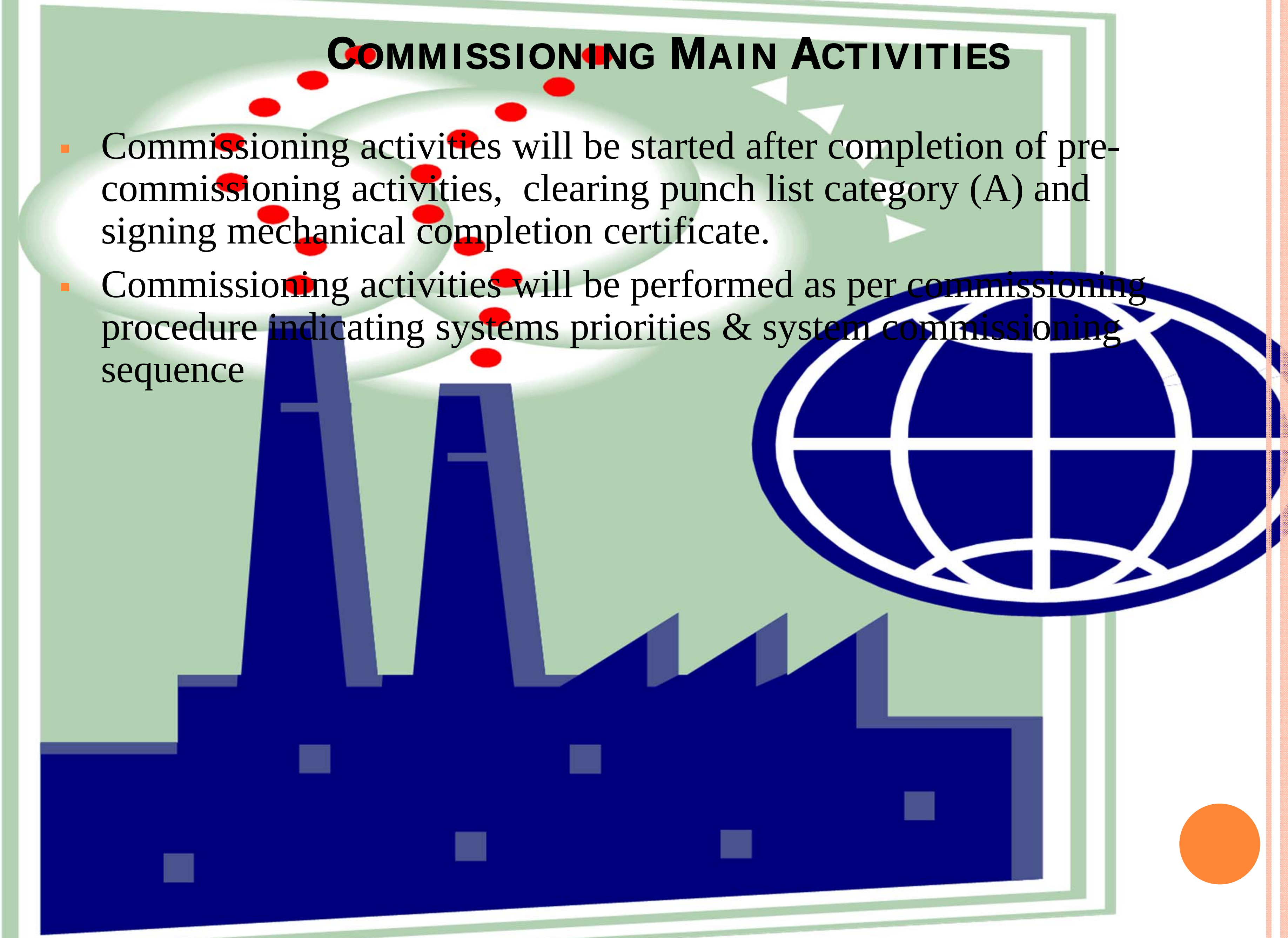
- THE WHOLE PROJECT HAS BEEN FABRICATED, ERECTED, INSTALLED AND TESTED TO THE REQUIREMENT OF THE CONTRACT DRAWINGS, SPECIFICATIONS, THE APPLICABLE CODES AND STANDARDS.
- ALL PRE-COMMISSIONING RELEVANT ACTIVITIES, TESTS, INSPECTIONS AND CHECKS HAVE BEEN CARRIED OUT AND FOUND ACCEPTABLE.
- Q/C DOCUMENTATION OF THE WHOLE PROJECT HAS BEEN AUDITED BY THE CUSTOMER SITE QUALITY CONTROL AND FOUND COMPLETED.
- ALL PUNCH LIST ITEMS CATEGORY (A) IN THE PROJECT WERE CLEARED.
- THE WHOLE PROJECT IS MECHANICALLY COMPLETED ON THE DATE MONTH, DAY, YEAR WITH THE FOLLOWING EXCEPTIONS.

EXCEPTIONS :

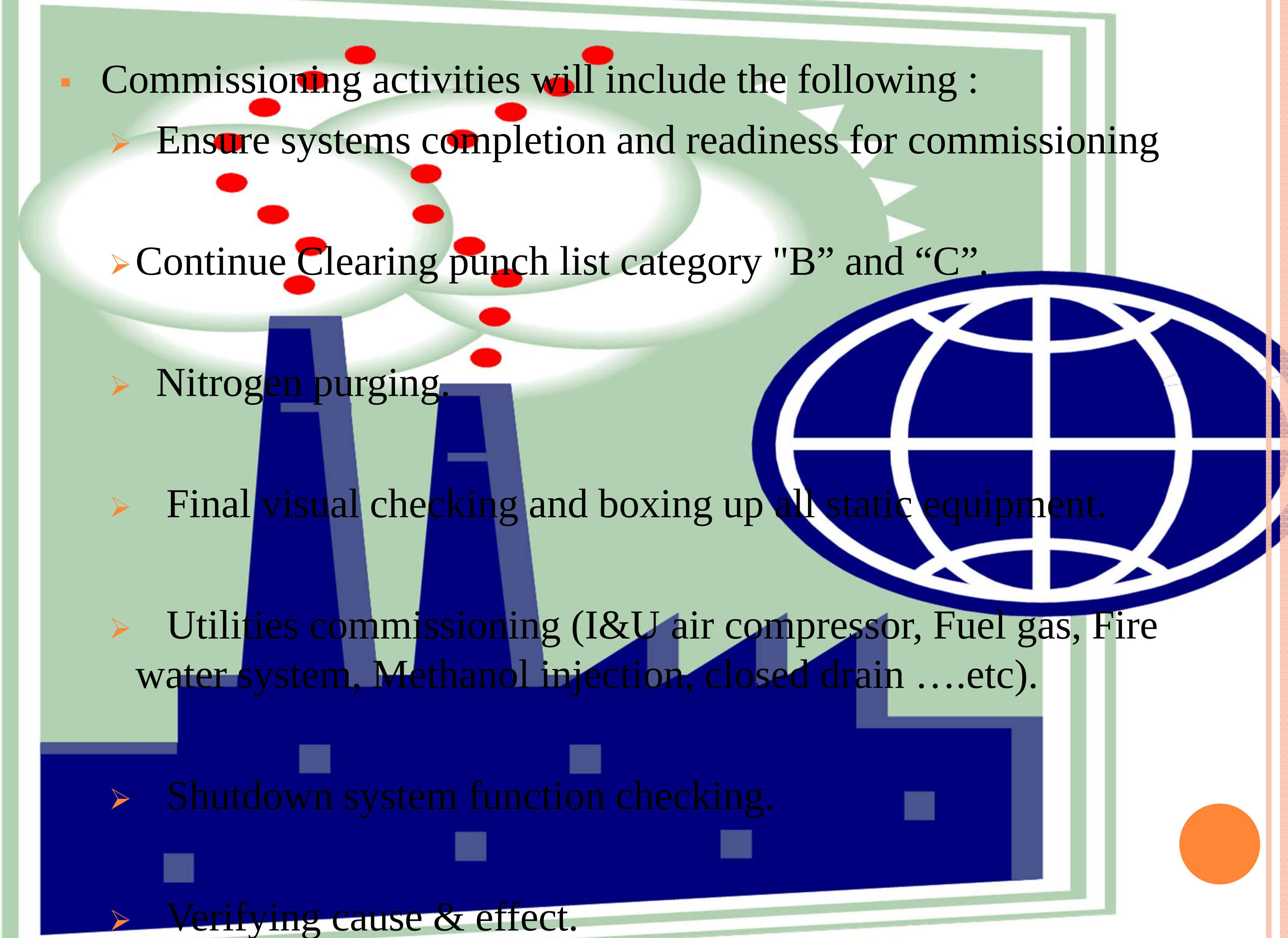
NOTE: ACCEPTANCE OF THE ABOVE PROJECT DOES NOT RELIEVE ENPPI/CONSTRUCTION CONTRACTOR FROM THEIR CONTRACTUAL OBLIGATIONS AND RESPONSIBILITIES.

COMPANY	CONST. CONTRACTOR	ENPPI	CUSTOMER
NAME			
TITLE			
SIGNATURE			
DATE			

COMMISSIONING MAIN ACTIVITIES



- Commissioning activities will be started after completion of pre-commissioning activities, clearing punch list category (A) and signing mechanical completion certificate.
- Commissioning activities will be performed as per commissioning procedure indicating systems priorities & system commissioning sequence



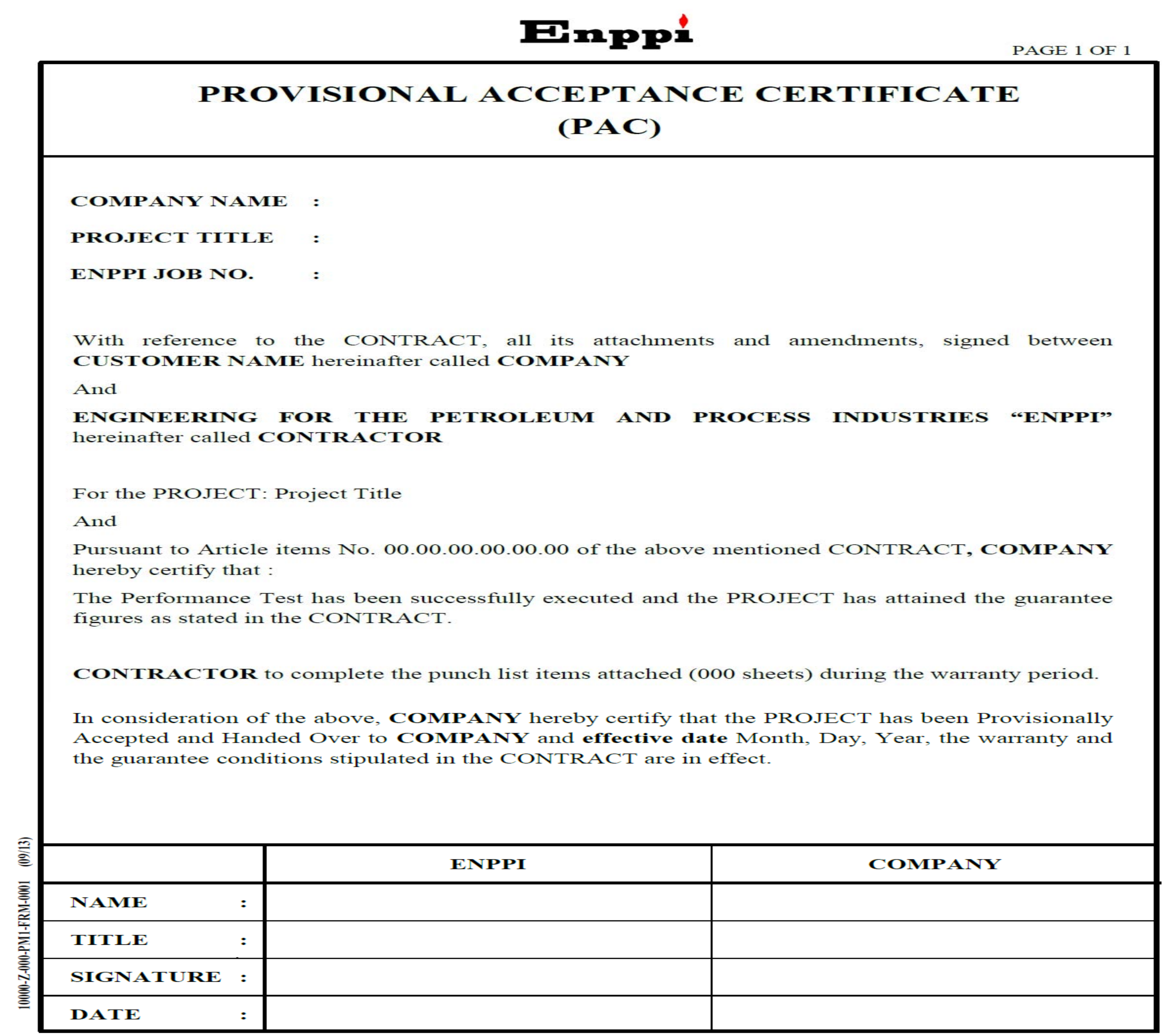
- Commissioning activities will include the following :
  - Ensure systems completion and readiness for commissioning
  - Continue Clearing punch list category "B” and “C”.
  - Nitrogen purging.
  - Final visual checking and boxing up all static equipment.
  - Utilities commissioning (I&U air compressor, Fuel gas, Fire water system, Methanol injection, closed drain ….etc).
  - Shutdown system function checking.
  - Verifying cause & effect.

- Final alignment and coupling installation for rotating equipment
- Running auxiliaries for rotating equipment
- Motors no load run test.
- Heaters drying out
- Piping nitrogen drying
- Desiccant dry out Operations.

Main Items

- PTW Sign off.
- All line up checks as per drawings.
- PSVs are per LO/LC register.
- BDV is working properly (Well tested) & lined up.
- Area House-keeping
- Adequate pipe supporting.
- Access for operation and maintenance adequate for operation.
- Guarding of machines and moving parts adequately addressed.
- Lifting beams tested and labeled.
- Safety equipment addressed and installed, shower systems tested.
- Fire systems installed as per specification.
- Hazardous areas clearly labeled and identified.

PROVISIONAL ACCEPTANCE CERTIFICATE



Enppi

PAGE 1 OF 1

PROVISIONAL ACCEPTANCE CERTIFICATE (PAC)

COMPANY NAME :

PROJECT TITLE :

ENPPI JOB NO. :

With reference to the CONTRACT, all its attachments and amendments, signed between **CUSTOMER NAME** hereinafter called **COMPANY**

And

ENGINEERING FOR THE PETROLEUM AND PROCESS INDUSTRIES "ENPPI" hereinafter called **CONTRACTOR**

For the PROJECT: Project Title

And

Pursuant to Article items No. 00.00.00.00.00.00 of the above mentioned CONTRACT**, COMPANY** hereby certify that :

The Performance Test has been successfully executed and the PROJECT has attained the guarantee figures as stated in the CONTRACT.

CONTRACTOR to complete the punch list items attached (000 sheets) during the warranty period.

In consideration of the above, **COMPANY** hereby certify that the PROJECT has been Provisionally Accepted and Handed Over to **COMPANY** and **effective date** Month, Day, Year, the warranty and the guarantee conditions stipulated in the CONTRACT are in effect.

	ENPPI	COMPANY
NAME :		
TITLE :		
SIGNATURE :		
DATE :		

10000-Z-000-PM1-FRM-0001 (09/13)

Gel Structure